

DRUM MEMORIES MODULES • SYSTEMS

Drum Memory System Model S2

The VRC Model 52 Drum Memory System combines an 80 track, 200,000 bit magnetic drum with performance-proven digital modules to provide truly economical storage with random access capability.

Normal operation of the drum is from a standard 120 volt, 60 cycle, single-phase power source providing speeds of either 1800 or 3600 rpm, with maximum access time of 34 or 17 milliseconds. If desired, higher speeds may be obtained from a 400 cycle power source. Manchester non-return-to-zero (phase modulation) recording is used to enhance the operating margin at the densities required. This recording technique produces playback

voltages which are either fully positive (a one) or fully negative (a zero) at the strobe time. Therefore, the effective playback signal is twice the amplitude of that produced by other recording methods in which the sense amplifier must discriminate between the presence or absence of flux change. (Figure 1, left, illustrates results obtained with this recording method.)

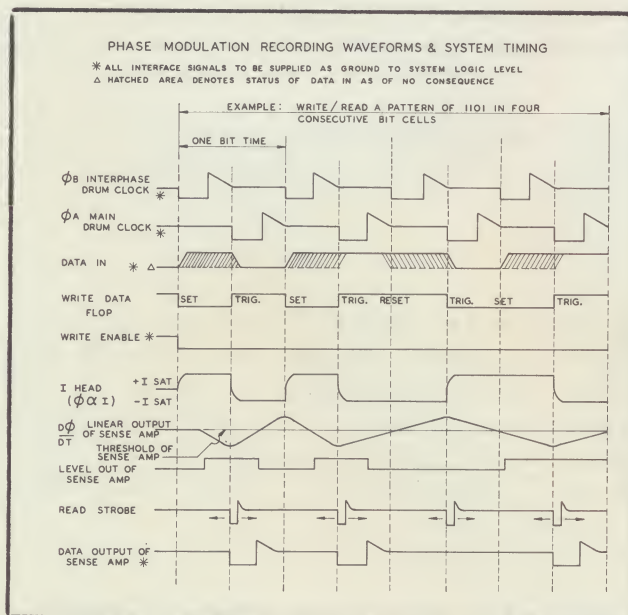
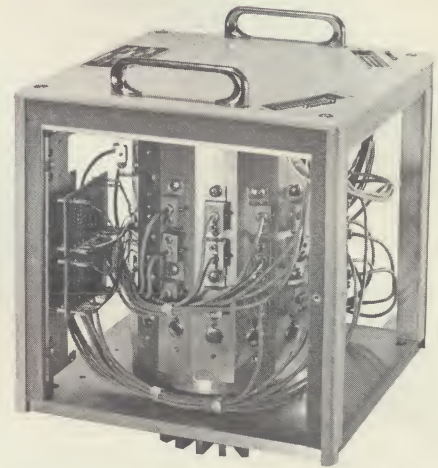


Fig. 1

Head selection is through a diode matrix as shown in Figure 2. With the "X" axis of the matrix assumed in the direction of the read/write bus, the "Y" axis then becomes associated with the center tap return of the heads in the matrix. To select a particular head from the matrix - head₁₁ for example - matrix drivers X₁ and Y₁ are turned ON. The read/write bus is at approximately the value of the negative supply voltage, and the diodes connecting the writer are back biased OFF. The playback voltage induced in head₁₁ is coupled to the input of the reader with no appreciable drop. Selection currents on both sides of the head are equal and opposite, producing no disturb flux in the written data on the selected track. Selection diodes at head₁₂ are back biased. Even though the diodes on head₂₁ are forward biased, the induced voltage in head₂₁ is not allowed to reach the read/write bus, since the output transistors in X₂ are cut OFF. When writing, the action is the same as for reading, since sufficient base drive is available in the matrix driver transistors to conduct the write currents.

CIRCUITS

As explained above, the VRC Type 2301* or 3301* X Select Driver is used with a Type 2302* or 3302* Y Select Driver to form a two-coordinate X-Y Selection Matrix for the drum heads. Each of the X Select Drivers contains four circuits with a 6-input AND gate. These modules are suitable for recording currents of 150 milliamps or less with frequencies up to 5 megacycles. The turn-ON,

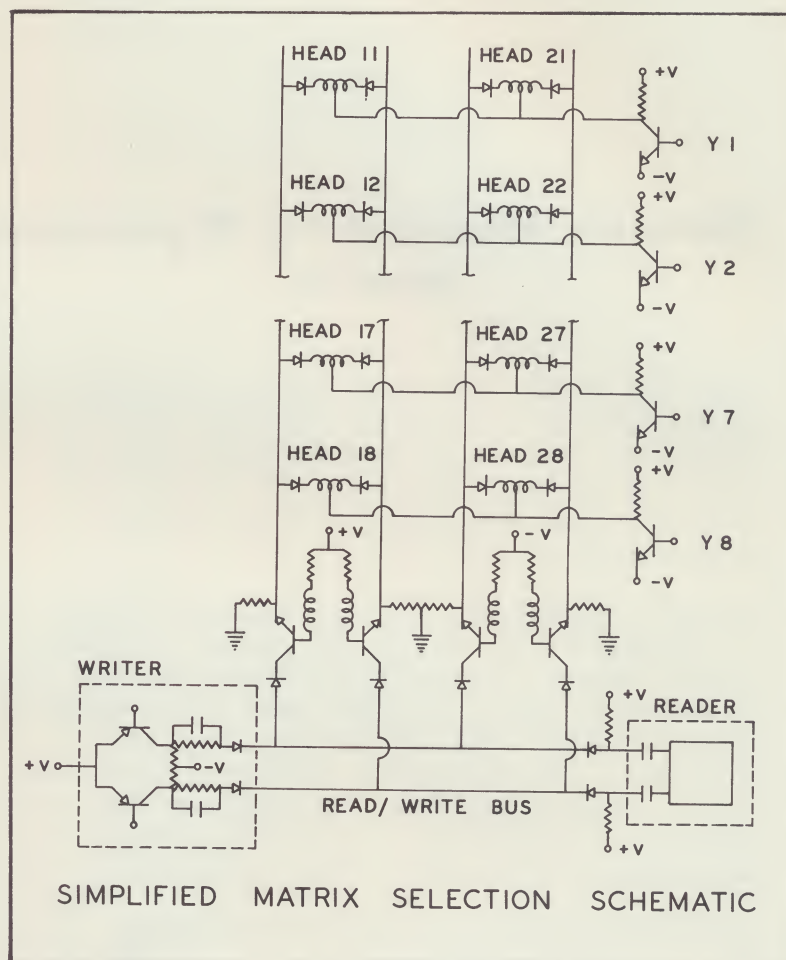


Fig. 2

*The VRC 2000 module series is used with positive logic levels. The 3000 series is used with negative logic levels.

turn-OFF times are less than 1 microsecond. Read voltages are conducted to read/write bus with no attenuation.

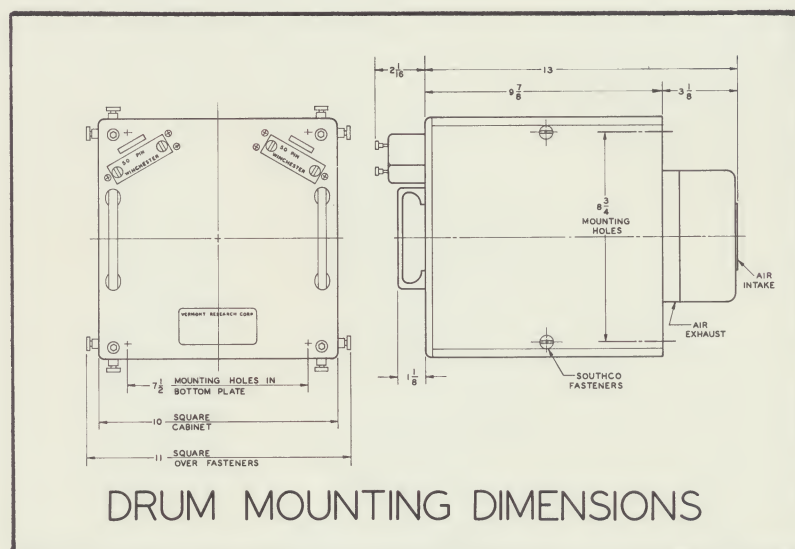
The Type 2302 or 3302 Y Select contains 8 circuits each with 6-input AND gates. Input gates are pre-wired to allow direct binary decoding. The driver is suitable for recording currents of 150 milliamps or less at frequencies up to 2.5 megacycles. The Y driver controls the bias on the center tap of a row of magnetic heads. When ON, the center tap of the selected row is returned to ground through a saturated transistor.

The Type 2101 or 3101 Amplifier is used for both data and timing track amplification. Both series contain a differential high gain amplifier to produce a linear amplification of the drum head playback voltage. The gain of the linear amplifier is controlled by feedback to a nominal 50. Track switching recovery time is less than 50 microseconds, and write noise recovery time is less than 5 microseconds. The threshold and shaper circuit is a temperature- and voltage-stabilized differential amplifier with a threshold level which when exceeded produces a logic level pulse in conjunction with the clock strobe at the output of the amplifier. The pulse width output may be varied from 50 nanoseconds to a width representing 50% of a pulse period time.

The VRC Type 2201 or 3201 Write Amplifier is used for recording. With the correct input logic as indicated above, it records phase modulation on the drum surface. A pair of 3-input AND gates enables either the one or zero side of the writer, while a saturated ground emitter switch supplies the current via a limiting and shaping network to either half coil of the driven head. The output current is nominally 100 milliamps, but may be varied up to 150 milliamps depending on requirements.

PACKAGING

The Model 52 Drum System is composed of two separate items; the magnetic drum, with overall dimensions of 11 x 11 x 15 inches, mounted on four shock mounts and easily accommodated within a normal 19 inch electronic mounting rack; and the associated circuits - on 4-1/4 by 6-1/4 inch epoxy glass boards with a 35-pin Elco connector - mounted in a module chassis also made for a 19 inch rack. Total rack opening required is 21 inches.



**Vermont Research
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April 1, 1966

Mr. T. Nelson
Systems Consultant
Box 1546
Poughkeepsie, New York 12603

Dear Mr. Nelson:

Enclosed is technical information on Vermont Research Corporation Drum Memory System Model 52 that you requested.

The \$5,000 price provides a drum and electronics typically capable of storing 4096 18-bit words, serially addressable. A typical type interface for the Drum Memory System would be static registers of the flip-flop type operating on either positive or negative logic. The information bulletin indicates how such a unit is normally utilized.

If your storage requirement is for a larger capacity device, Vermont Research Corporation manufactures Drum Memory Systems with storage capabilities up to and including 100,000,000 bits with data transfer rates to 1.8 megacycles.

Your interest in Vermont Research Corporation is very much appreciated and we would be happy to send you any other information that you might desire.

Very truly yours,

VERMONT RESEARCH CORPORATION



Prentiss L. Smith,
Vice President, Sales